

1        **ADJUSTABLE DEVICE WITH A MUSICAL KEYBOARD STAND**

2        **BACKGROUND OF THE INVENTION**

3        1. Field of the Invention

4                The present invention relates to an adjustable device, and more  
5 particularly to the adjustable device in combination with a stand to support a  
6 musical keyboard thereon.

7        2. Description of Related Art

8                With reference to Figs. 7 and 8, a conventional adjustable device is  
9 mounted between a first stand (30) and a second stand (40) to allow the musical  
10 keyboard stand to adjust its height so that the operator is able to freely adjust the  
11 height of the keyboard stand (not shown) according to the operator's height.

12               The adjustable device includes a first disk (31) securely mounted on a  
13 side of the first stand (30), a second disk (41) securely mounted on a side of the  
14 second stand (40) and having multiple adjusting holes (411) defined through a  
15 peripheral edge of the second stand (40) and an adjusting rod (32) extending  
16 through the first stand (30), the first disk (31) and into the second disk (41). A  
17 spring (33) is mounted around the adjusting rod (32) and abutted between two  
18 opposite inner faces of the first stand (30).

19               When the adjustable device is in application to adjust the relative  
20 position of the first stand (30) to the second stand (40), the user is able to pull a  
21 knob (34) formed on a free end of the adjusting rod (32) extending out of the first  
22 stand (30) to allow the first stand (30) to be freely pivoted relative to the second  
23 stand (40) so as to adjust the height of the musical keyboard stand. When the  
24 height of the musical keyboard stand is determined, the operator is able to let go

1 the knob (34) to allow the free end of the adjusting rod (32) to extend into one of  
2 the adjusting holes (411) of the second disk (41). Thereafter, the relative position  
3 between the first stand (30) and the second disk (40) is fixed. Although the  
4 adjustment of the musical keyboard stand is able to be accomplished via the  
5 conventional adjustable device, the operator will have to hold either one of the  
6 first or the second stand (30,40) with one hand and the knob (34) with the other  
7 hand, which is quite inconvenient to the operator.

8 In order obviate the foregoing shortcoming, a different adjustable device  
9 is introduced to the market.

10 With reference to Figs. 9 and 10, a second conventional adjustable  
11 device is shown and includes a first disk securely mounted on a first stand (both  
12 the first disk and the first stand are not shown for brevity) and a second disk (51)  
13 mounted on the second stand (50).

14 The first disk has a blocking head (53) pivotally mounted on a side of the  
15 first disk and a resilient element (54), i.e. a spring, having a first end securely  
16 engaged with a side face of the first disk and a second end abutting a side face of  
17 the blocking head (53) to urge a free end of the blocking head (53) to pivot  
18 toward the center of the first disk.

19 The second disk (51) has a notched disk (52) securely mounted on a  
20 center of the second disk and having a first stop (521) and a second stop (522)  
21 spatially formed on a side face of the notched disk (52) and an abutting bar (55)  
22 pivotally mounted on the notched disk (52) and having a free end engaging with  
23 a side face of the blocking head (53).

24 It is noted that when the musical keyboard stand is folded, the blocking

1 head (53) abuts the free end of the abutting bar (55) which is stopped by the first  
2 stop (521). When the operator is adjusting the first stand and the second stand  
3 (50) by enlarging the relative angle between the first stand and the second stand  
4 (50), due to the abutting force from the resilient element (54), the blocking head  
5 (53) is forced by the resilient element (54) to urge the free end of the abutting bar  
6 (55). Therefore, when the relative angle between the first stand and the second  
7 stand increases, the abutting bar (55) moves along the blocking head (53) until  
8 the abutting bar (55) is stopped by the second stop (522). Then after the blocking  
9 head (53) separates the abutting bar (55), the free end of the blocking head (53)  
10 falls into the positioning tooth (523) of the notched disk (52) where the relative  
11 angle between the first stand and the second stand is maximum. The free end of  
12 the blocking head (53) is configured in such a way that the free end of the  
13 blocking head (53) is easy to fall into and away from any one of the teeth of the  
14 notched disk (52). Therefore, the operator is able to step by step adjusts the  
15 relative angle between the first stand and the second stand (50) until the abutting  
16 bar (55) is stopped by the first stop (521) where continuous moving the first  
17 stand relative to the second stand (50) allows the free end of the abutting bar (55)  
18 to be abutted by the blocking head (53) again. The single-handed operating  
19 mechanism does solve the inconvenience from the conventional adjustable  
20 device to quickly and conveniently adjust the relative between the two stand.  
21 However, the teeth is becoming worn as the time of using the adjustable device  
22 lasts and the resilience of the resilient element (54) becomes weaker and weaker  
23 due to fatigue. The conventional adjustable device still can not fulfill the  
24 requirements.

1 To overcome the shortcomings, the present invention tends to provide an  
2 improved adjustable device to mitigate the aforementioned problems.

### 3 SUMMARY OF THE INVENTION

4 The primary objective of the present invention is to provide an improved  
5 adjustable device to allow the user to easily and conveniently adjust the angle  
6 between the two stands.

7 Other objects, advantages and novel features of the invention will  
8 become more apparent from the following detailed description when taken in  
9 conjunction with the accompanying drawings.

### 10 BRIEF DESCRIPTION OF THE DRAWINGS

11 Fig. 1 is an exploded perspective view showing the adjustable device in  
12 combination with two stands;

13 Fig. 2 is a partially cross-sectional view showing the internal relative  
14 position of the parts when the two stands are folded;

15 Fig. 3 is a partially cross-sectional view showing the internal relative  
16 position of the parts when the two stands are fully extended away from each  
17 other;

18 Fig. 4 is a perspective view showing the application of the adjustable  
19 device of the present invention;

20 Fig. 5 is a side plan view showing the application of the adjustable  
21 device of the present invention;

22 Fig. 6 is a schematic view showing the two stands are adjusted to support  
23 thereon a musical keyboard;

24 Fig. 7 is a perspective view of a conventional adjustable device for a

1 musical instrument;

2 Fig. 8 is a perspective view showing the application of the adjustable  
3 device shown in Fig. 7;

4 Fig. 9 is a schematic view showing a different conventional adjustable  
5 device to adjust the musical stand height; and

6 Fig. 10 is a schematic view showing the application of the adjustable  
7 device in Fig. 9.

## 8 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

9 With reference to Fig. 1, the adjustable device in accordance with the  
10 present invention is incorporated with a first stand (10) and a second stand (20)  
11 pivotally connected to the first stand (10) and includes a first disk (11) securely  
12 mounted on a side of the first stand (10) and a second disk (21) securely mounted  
13 on a side of the second stand (20).

14 The adjustable device of the present invention further has a finger (12), a  
15 sliding plate (13) and a spring (14) mounted on the finger (12).

16 The first stand (10) has a first pivot hole (101) and a finger hole (102)  
17 corresponding to the finger (12). The finger (12) has a first end on which a  
18 slanted face (121) is formed and a second end provided with a threading (122).  
19 The sliding plate (13) has a through hole (131) defined to correspond to the first  
20 pivot hole (101) of the first stand (10) and a pyramidal head (132) corresponding  
21 to the slanted face (121) of the finger (12).

22 The second disk (21) has a second pivot hole (201) defined to  
23 correspond to the through hole (131) of the sliding plate (13), a first boss (211), a  
24 second boss (212) spatially aparted from the first boss (211) and a pivot (22)

1 extending through the second stand (20), the second disk (21), the sliding plate  
2 (13), the finger (12), the first disk (11) and the first stand (10) to mate with a cap  
3 (221). Because the pivot (22) is a threaded bolt, the engagement between the  
4 pivot (22) and the cap (221) is able to secure the engagement between the first  
5 and the second stand (10,20).

6         When the adjustable device and the two stands (10,20) are assembled, it  
7 is noted that due to the extension of the pivot (22) through the second stand (20),  
8 the second disk (21), the sliding plate (13), the finger (12), the first disk (11) and  
9 the first stand (10) to mate with a cap (221), the finger (12) is movably received  
10 between the first disk (11) and the second disk (21) and the sliding plate (13) is  
11 slidably sandwiched between the first disk (11) and the second disk (21).

12         It is further noted that the second disk (21) has multiple adjusting holes  
13 (23,24,25,26,27) defined along a peripheral edge of the second disk (21) to  
14 correspond to the free end of the finger (12).

15         With reference to Figs. 2 and 3, it is to be noted that when the first and  
16 second stands (10,20) are folded, the free end of the finger (12) is received in the  
17 last adjusting hole (27) and when the angle between the first and second stands  
18 (10,20) are fully extended, the free end of the finger (12) extends into the first  
19 adjusting hole (23).

20         With reference to Figs. 4, 5 and still using Figs. 2 and 3 for reference,  
21 during adjustment of the relative angle between the first and second stands  
22 (10,20), the user first fully stretches the first stand (10) relative to the second  
23 stand (20) from the status where the first stand (10) and the second stand (20) are  
24 folded. It is noted that when the first and second stands (10,20) are folded, the

1 slanted face (121) engages with a side face of the pyramidal head (132). That is,  
2 the free end of the finger (12) is stopped by the sliding plate (13) from extending  
3 into any one of the adjusting holes (23,24,25,26,27). As the relative angle  
4 between the first and second stands (10,20) increases, the sliding plate (13) is  
5 stopped by the second boss (212). Meanwhile, continuous movement of the first  
6 stand (10) relative to the second stand (20) allows the free end of the finger (12)  
7 to extend into the first adjusting hole (23). As a result of the extension of the free  
8 end of the finger (12), the relative angle between the first stand (10) and second  
9 stand (20) is fixed, which is shown in Fig. 3.

10       Because the sliding plate (13) is stopped by the second boss (212), when  
11 the user is trying to narrow down the relative angle between the first and second  
12 stands (10,20), the retraction of the first stand (10) triggers the sliding movement  
13 of the slanted face (121) from one adjusting hole to another (23,24,25,26,27).  
14 When the finger (12) is moving backward, the sliding plate (13) is thus forced by  
15 the finger (12) to move away from the second boss (212) and toward the first  
16 boss (211). Therefore, because of the slanted face (121), the finger (12) is easily  
17 extended into any one of the adjusting holes (23,24,25,26,27) to fix the relative  
18 position between the first and second stands (10,20).

19       When the first stand (10) moves toward the second stand (20) to narrow  
20 down the relative angle between the first stand (10) and the second stand (20),  
21 the sliding plate (13) is eventually stopped by the first boss (211). Accordingly,  
22 continuously pivoting the first stand (10) in relation to the second stand (20)  
23 allows the slanted face (121) to ride on the pyramidal head (132) to combine the  
24 finger (12) and the sliding plate (13), which returns to the situation as shown in

1 Fig. 2.

2 It is noted that the threading (122) of the finger (12) may extend through  
3 the first stand (10) to engage with a nut (123) to ensure the engagement between  
4 the finger (12) and the first stand (10) and the spring (14) to be securely mounted  
5 around the finger (12).

6 With the aforementioned arrangement, the user needs not worry about  
7 the worn of the teeth as shown in the conventional adjustable device and the  
8 inconvenience caused by a different adjustable device.

9 In summary, the adjustable device allows the user to accurately,  
10 conveniently and timely accomplish the adjustment between the first and second  
11 stands such that the performer of the musical keyboard is able to easily adjust the  
12 stand height to comply with the height of the performer so as to present the best  
13 performance.

14 It is to be understood, however, that even though numerous  
15 characteristics and advantages of the present invention have been set forth in the  
16 foregoing description, together with details of the structure and function of the  
17 invention, the disclosure is illustrative only, and changes may be made in detail,  
18 especially in matters of shape, size, and arrangement of parts within the  
19 principles of the invention to the full extent indicated by the broad general  
20 meaning of the terms in which the appended claims are expressed.